Indian Journal of Science and Technology 2016 vol.9 N18

Comprehensive analysis of electrochemical and structural-dynamic properties of bitumnious insulating materials

Kemalov R., Kemalov A., Nam F.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

At the current stage the strategic trend of development of the oil and gas industry is increase in the oil conversation depth with the use of relatively new approaches and methods of mining, treatment, transporting and processing of different kinds of hydrocarbons. Along with that, implementation of new processing techniques, improvement of the production performance and quality of the output products, intensification and reconstruction of the existing oil and gas plants depend not only on the structural materials used but also on the right choice of anti-corrosive materials for protection thereof. According to the existing ideas of the most important factors determining anti-corrosive properties of bituminous insulating materials is mechanical insulation of the material from the aggressive media. Since the insulating film consists of the areas of different density with numerous micropores then by the coating contact with water or electrolyte solutions liquid penetration through the film (diffusion) as well as moisture adsorption by active centers of the film binder (swelling) take place. The criterion of insulating capacity is high effective resistance (minor permeability), low capacity (minor swelling) and slow change in the behavior in the time domain. No less important factor determining the protective action of coatings is film adhesion ensuring not only film adhesion to the material but also preventing appearance of a new phase on the at the metal-film border. The film adhesion strength is affected by the internal stresses arising during the process of coating formation and relaxation processes. In order to protect material from corrosion, special substances are introduced in the insulating material that is able either to change kinetics of electrode reactions determining the corrosive process or inhibit it.

http://dx.doi.org/10.17485/ijst/2016/v9i18/93740

Keywords

Bitumen, Coatings, Composite protective material, Composition, Electrochemistry, Oil and gas equipment, physical-mechanical properties